Appendix I3

Avian Survey

Technical Report – Part 4 of 4

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ATTACHMENT 4

Site Photos of Representative Habitat

Block 1 -- Representative Habitat – Note Manicured Understory

Block 2 -- Representative Habitat – Note Overgrazed Condition

Block 6 -- Representative Habitat

Block 7 -- Representative Habitat

Block 9 -- Representative Habitat

Block 12 – Dismissed from Survey due to Ashe Juniper Removal in Entire Block

Block 7 – Portion Dismissed from Survey Due to Ashe Juniper removal

Block 9 -- Ailing Live Oaks Infected by Hypoxylon Canker

ATTACHMENT 5

GCWA Presence Absence Field Data Forms

US 281
Visit #1

GOLDEN-CHEEKED WARBLER/ BLACK-CAPPED VIREO FIELD DATA FORM

Study Site	US 281	Weather Conditions		
Tract #	Blocks		Begin	End
Visit #	1	Temperature	55°F.	78°F.
Date	3/31/10	Cloud Cover	Clear	Clear
Observer	JTidwell + JAllen	Precipitation	None	None
Time Begin-End	745am / 30pm	Wind Speed/Direction	0-5/S	5-10/S

General Survey Notes (e.g., Additional wildlife information, etc.)

~~# Blocks~~ Blocks 3 & 4 no ROE. Blocks 5 & 10 ~~not~~ not on maps.
Block #11 = no ROE
4 for habitat.

BLVU ROPI STFL CACH BGGN RCSP HOFI
TUVU WWDO EAPH BCTI NOMO CHSP LEGO
BBWD MODO WEVI CARW CEDW AMCA
RTHA BCHU SCJA BEWR NAWA GTGR
COHA GFWP CLSW RCKI OCWA BHCB

Grey Fox
WTD

Species	Song Type	Male #	Female #	Juv #	Distance from Observer (feet)	Direction from Observer (degrees)	Time of Observation	Observation Type (Auditory or Visual)	Observation Mapped or GPS recorded (Yes or No)

Bird Observation Notes – (Age (HY, SY, ASY), behavior observed, etc.)

No GCWA detected

US 281
Visit # 2

GOLDEN-CHEEKED WARBLER/ BLACK-CAPPED VIREO FIELD DATA FORM

Study Site	US 281	Weather Conditions		
Tract # Blocks	1, 2, 6, 7, 9+12		Begin	End
Visit #	2	Temperature	40° F.	62° F.
Date	4/8/10	Cloud Cover	Clear	Clear
Observer	Hawk + Talbert	Precipitation	None	None
Time Begin-End	7:30 – 11:30	Wind Speed/Direction	0-5/N	5-10/N

General Survey Notes (e.g., Additional wildlife information, etc.)

BLUE TBCHI CARW WAWA BHCO
TUVU DOWO BEWR ~~BE~~ YRWA HOFI
ROPI EAPH RCKI LEGO
WWDO WEVI BGGN SOTA
MODO SCJA HETH RCSP
COGD CACH NOMO NOCA
BADO BCTI EUST GTTGR

WT Deer

Species	Song Type	Male #	Female #	Juv #	Distance from Observer (feet)	Direction from Observer (degrees)	Time of Observation	Observation Type (Auditory or Visual)	Observation Mapped or GPS recorded (Yes or No)

Bird Observation Notes – (Age (HY, SY, ASY), behavior observed, etc.)

No GCWA detected

GOLDEN-CHEEKED WARBLER/ BLACK-CAPPED VIREO FIELD DATA FORM

Study Site	US 281	Weather Conditions		
Tract #	All (Blocks 1, 2, 6, 7, 9 & 12)		Begin	End
Visit #	3	Temperature	64°F	70°F
Date	4/14/10	Cloud Cover	100%	100%
Observer	RB/JA	Precipitation	—	mist
Time Begin-End	0734 - 1144	Wind Speed/Direction	0-3/S	—

General Survey Notes (e.g., Additional wildlife information, etc.)

TUVU	CACH	OCWA	INBU
WWDO	BCTI	NAWA	PABU
BCHU	CARW	SUTA	BHCO
EAPH	BEWR	SPTO	LEGO
WEVI	BGGN	RCSP	HOSP
BARS	NOMO	NOCA	- White-tailed deer

Species	Song Type	Male #	Female #	Juv #	Distance from Observer (feet)	Direction from Observer (degrees)	Time of Observation	Observation Type (Auditory or Visual)	Observation Mapped or GPS recorded (Yes or No)

Bird Observation Notes – (Age (HY, SY, ASY), behavior observed, etc.)

*No GCWA detected

GOLDEN-CHEEKED WARBLER/ BLACK-CAPPED VIREO FIELD DATA FORM

Study Site	US 281	Weather Conditions		
Tract #	All (Blocks 1, 2, 6, 7, 9 + 12)		Begin	End
Visit #	4	Temperature	66°F	82°F
Date	4/29/10	Cloud Cover	Overcast	Clear
Observer	JK	Precipitation		
Time Begin-End	0730 - 1pm	Wind Speed/Direction	0-5/S	5-10/S

General Survey Notes (e.g., Additional wildlife information, etc.)

BLVI	YBCU	CACH	NOMO	NOCA
TUVI	CHSW	BCTI	EUST	PABU
AMKE	BCHU	CARW	NAWA	GTGR
ROPI	EAPH	BEWR	FISP	BHCO
WWDO	WESJ	RCKI	RCSP	HOFI
MODO	CLSW	BGGN	CHSP	LEGO
				HOSP

Species	Song Type	Male #	Female #	Juv #	Distance from Observer (feet)	Direction from Observer (degrees)	Time of Observation	Observation Type (Auditory or Visual)	Observation Mapped or GPS recorded (Yes or No)

Bird Observation Notes – (Age (HY, SY, ASY), behavior observed, etc.)

- No GCWA detected

GOLDEN-CHEEKED WARBLER/ BLACK-CAPPED VIREO FIELD DATA FORM

Study Site	US281	Weather Conditions		
Tract # Blocks	1, 2, 6, 7, 9, +12		Begin	End
Visit #	5	Temperature	70°F.	80°F
Date	5/13/10	Cloud Cover	Cloudy	Cloudy
Observer	JLuhl	Precipitation	—	—
Time Begin-End	0730-1200	Wind Speed/Direction	0-5	5-10

General Survey Notes (e.g., Additional wildlife information, etc.)

BLVU EAPH CARW PABU
TUVU EAKI BEWR GTGR
ROPI WEVI NOMO BHCO
MODO WEST RCSP HOFI
YBCU CACH CHSP LEGO
CHSW BCTI NOCA HOSP

- WT Deer
- Cottontail

Species	Song Type	Male #	Female #	Juv #	Distance from Observer (feet)	Direction from Observer (degrees)	Time of Observation	Observation Type (Auditory or Visual)	Observation Mapped or GPS recorded (Yes or No)

Bird Observation Notes – (Age (HY, SY, ASY), behavior observed, etc.)

No GCWA detected...

US 281 #6
(survey + GCWA tape played)

GOLDEN-CHEEKED WARBLER/ BLACK-CAPPED VIREO FIELD DATA FORM

Study Site	US 281	Weather Conditions		
Tract # Blocks	1, 2, 6, 7, 9 + 12		Begin	End
Visit # 6		Temperature	73°F	79°F
Date 5/26/10		Cloud Cover	Cloudy	PCloudy
Observer J. Kuyer		Precipitation	—	—
Time Begin-End	7am – 12:00noon	Wind Speed/Direction	0-5/S	0-5/S

General Survey Notes (e.g., Additional wildlife information, etc.)

WWDO CACH RCSP BHCO
MODO BCTI CHSP HOFI
YBCU CARW NOCA LEGO
WEST BEWR PABU
AMCR NOMO GTGR

Cottontail
Leopard Frog

Species	Song Type	Male #	Female #	Juv #	Distance from Observer (feet)	Direction from Observer (degrees)	Time of Observation	Observation Type (Auditory or Visual)	Observation Mapped or GPS recorded (Yes or No)

Bird Observation Notes – (Age (HY, SY, ASY), behavior observed, etc.)

No GCWA detected – played GCWA tape all blocks visited with no response. Absence of GCWA documented in second consecutive year.

GOLDEN-CHEEKED WARBLER PRESENCE/ABSENCE FIELD DATA FORM

Study Site (circle)	US 281 or Loop 1604	Weather Conditions		
Habitat Block #	9-13 [redacted]		Begin	End
Observer	Mark Kainer	Temp	69	80
Date	5/14/09	Cloud Cover	PC	PC
Field Visit #	6	Precipitation	—	—
Time Begin—End	6:30-10:00	Wind Speed/Direction	Min 0	Max 10 SE

General Notes (e.g., additional wildlife information, observed human activity on site, etc.)

Various spp.

yellow-billed cuckoo, morning dove, titmice, N. cardinal, ruby-crowned kinglet, N. mockingbird, Bewicks wren, white-winged dove, Carolina wren, great tailed grackle, European Starling, Chimney swift, black-bellied whistling ducks, scissortail, house sparrow, red-eyed vireo, Canyon wren, ash-throated flycatcher, rufous crown sparrow, W. scrub jay, cliff swallow, turkey vulture, Coopers hawk, summer tanager, Carolina Chickadee, Crested Cara Cara, GF woodpecker, lesser goldfinch

Golden-cheeked Warbler Observations

Male #	Song Type	Female #	Juv #	Distance from Observer (feet)	Direction from Observer (degrees)	Time of Observation	Observation Type (Auditory or Visual)	Observation Mapped or GPS-recorded (Yes or No)

Additional Notes

Played calls of GCW and eastern screech owl at various spots w/i survey area. No GCWA heard or observed.

Golden-cheeked Warbler Survey
US 281
from Loop 1604 to Borgfeld Drive
Bexar County, Texas

Submitted to:
Jacobs
Alamo Regional Mobility Authority
Texas Department of Transportation

June 4, 2014

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1.0 INTRODUCTION

This report documents the results of a third year of surveys for the federally and state-listed endangered Golden-cheeked Warbler (*Setophaga chrysoparia*) (GCWA) within and adjacent to the project corridor for proposed improvements between Borgfeld Drive and Loop 1604 along US 281 in Bexar County, Texas. This survey, conducted by Hicks & Company (H&C) personnel, follows up a habitat assessment and survey conducted by Blanton & Associates, Inc. (B&A) during the 2009 breeding season (B&A 2009) and a survey conducted by H&C during the 2010 breeding season (H&C 2010). The habitat assessment and surveys were conducted on behalf of the Alamo Regional Mobility Authority (Alamo RMA) and the Texas Department of Transportation (TxDOT) and, to date, have resulted in negative findings for GCWA presence. A letter from the U. S. Fish and Wildlife Service (USFWS) dated May 11, 2011, concurred with the 2009 and 2010 negative findings; however, the letter states that surveys should be conducted if construction is delayed more than three years. Because of this, H&C conducted the third year of survey during the 2014 breeding season. The results of this survey are documented herein.

The proposed project includes improvements to an approximately eight-mile stretch of US 281 extending from the south at Loop 1604, within the city of San Antonio, to the north at Borgfeld Drive in northern Bexar County, Texas (**Figure 1** in **Attachment 1**). The four direct connector ramps that comprise the northern half of the US 281 interchange with Loop 1604 are included in the proposed improvements. The proposed action has the logical termini of Loop 1604 on the south and Borgfeld Drive on the north, which provide rational end points for transportation improvements and review of environmental impacts; however, construction of the proposed improvements would extend north of Borgfeld Drive to approximately the Bexar-Comal County Line (Cibolo Creek) in order to tie the improvements back to the existing US 281 lanes. These surveys are intended to provide data to assess potential impacts to this endangered songbird.

Thirteen blocks of potential habitat totaling approximately 231 acres were identified and delineated within the 500-foot buffer from the proposed right of way during the 2009 habitat assessment (**Figure 2** in **Attachment 1**). These habitat blocks were further refined during the 2009 and 2010 survey efforts. Our general approach was to survey habitat mapped and refined during the 2009 habitat assessment and 2009 and 2010 surveys within the 500-foot buffer from the proposed right of way. Presence/absence surveys were conducted each season on the delineated habitat according to appropriate U.S. Fish and Wildlife Service (USFWS) protocols. A field visit was conducted on March 14, 2014, to reassess the potential habitat areas delineated in 2009. Approximately 32.14 acres of potential GCWA habitat was added to Block 2 on the northern end of the proposed project.

Figures 3.1 to **3.10** in **Attachment 1** depict the proposed right of way and the delineated habitat areas within the 500-foot buffer that were surveyed by H&C during the 2014 GCWA breeding season. Discussion of GCWA natural history, study methodologies, and results follow.

2.0 GOLDEN-CHEEKED WARBLER NATURAL HISTORY

GCWA Description

The GCWA is a small, neo-tropical songbird in the family Parulidae. Male GCWAs have a black back, throat, upper breast, and crown, white belly, black-streaked sides, white wing bars, and a black line through the eye with large yellow patches both above and below the eye. Female and immature GCWAs are duller, with olive upperparts with dark streaks and a yellowish or white chin (NatureServe 2012).

GCWA Habitat

According to the recovery plan, the GCWA inhabits two distinctly different habitat types: closed-canopy Ashe-juniper woodland in central Texas and pine-oak woodland in the highlands of southern Mexico to Nicaragua (USFWS 1992). The Ashe juniper-oak woodland is the breeding habitat for the GCWA in Central Texas. The GCWA nests only in climax stage woodlands with a high proportion of mature Ashe juniper trees interspersed with other deciduous species, and prefer areas with a moderate to high tree density with dense foliage in the upper levels (USFWS 1992). According to Ladd and Gass (1999), forest stands where GCWAs are typically found average about 40 years in age and 20 feet in height with about 70 percent canopy cover and a tree density of 400 trees per acre. The TPWD defines habitat as containing Ashe juniper minimally 15 feet tall with an average canopy height of 20 feet, canopy cover of 35 percent and containing at least 10 percent oaks (Campbell 2003). Klassen (2011) demonstrates that this can vary throughout the warbler's range as she documents successful Kinney and Edwards County (southwest extreme of the GCWA range) breeding in areas with 20–25 percent canopy closure containing as low as three percent oaks.

The mature Ashe juniper is a key habitat feature for the GCWA since the main component in the species' nest is strips of bark from aged juniper trees. The loose, stringy bark found in the species' nest is only observed in older, mature trees, which accounts for the reliance of the GCWA on mature Ashe juniper stands. A study by J.C. Kroll (1980) found that Ashe juniper trees began sloughing bark near the base of the tree by 20 years of age and by the crown at 40 years. A few other factors may contribute to an improved habitat for GCWAs. Ladd (1985) noticed that the suitable habitat for the species coincided with steep canyons or rugged slopes, but nests are not limited to canyons (Guilfoyle 2002). GCWAs may be associated with canyon slopes because of a combination of other factors influencing the habitat quality: 1) greater surface run-off and seepage, which favors growth of preferred tree species and increases arthropod availability, 2) protection from wildfires, or 3) increased protection against the threat of clearing due to the high cost that comes with clearing steep slopes (USFWS 1992).

More recent studies indicate and important relationship between the size of habitat patches and warbler demographics such as presence and abundance within the patch. Coldren (1998) and Baccus et al. (2007) have found that GCWA abundance increases and territory size decreases linearly with patch size. Further,

research indicates pairing and territory success both correlate positively to patch size. Patches of suitable oak-juniper habitat exceeding 100 hectares (ha) (247 acres) are considered prime habitat (Arnold et al. 1996; Coldren 1998; Butcher et al. 2010; Morrison et al. 2010). Specifically, Arnold et al. (1996) found warblers were not reliably found in patches smaller than 57 acres (23 ha) and Butcher et al. (2010) suggest patch sizes ranging from 37–68 acres (15–27.7 ha) to be minimums for reproductive success. In addition to patch size, the amount of mature mixed woodland in the landscape is considered to be the most important predictive landscape-scale variable to GCWA occurrence (Magness et al. 2006).

GCWA Life History

The GCWA was discovered and first collected by Osbert Salvin in Guatemala in 1859 and later described by Philip Lutley Sclater of the British Museum and Salvin in 1860 (Pulich 1976; USFWS 1990; Groce et al. 2010). The first Texas specimen collected was in 1864 near the confluence of the Medina and San Antonio Rivers in Bexar County, Texas, and the first GCWA nest was found in 1878 in Comal County. The GCWA was federally listed as an endangered species on May 4, 1990, by means of emergency rule. The final rule listing the GCWA as endangered under the ESA was published on December 27, 1990 (Pulich 1976; USFWS 1992; Groce et al. 2010). In February 1991, the species was designated as endangered by the State of Texas (USFWS 1992). Critical habitat for the GCWA has not been designated.

The GCWA winters in southern Mexico (State of Chiapas) and in the Central American countries of Guatemala, Honduras, and Nicaragua (USFWS 1992). The species breeds only in the mixed Ashe juniper–oak woodlands of Central Texas. Of all the avian species known to occur in Texas, the GCWA is the only species whose breeding range is completely limited to the state. The GCWA generally begins to arrive on the breeding grounds in central Texas in late February and early March. The migration route of the GCWA follows the coniferous-oak highlands of the Sierra Madre Oriental (NatureServe 2012). The majority of the adults and fledglings leave the breeding grounds and begin the southward migration back to the subtropics in late June to July.

The GCWA is an insectivorous hopping and gleaning species, consuming lepidopteran larvae and non-lepidopteran winged insects (Groce et al. 2010) with beetles, caterpillars, Homopterans, Hemipterans, and spiders being their most common prey items (USFWS 1992). Much of the foraging time of the GCWA on the breeding grounds is spent gleaning for insects by moving from branch to branch within the upper portions of the woodland canopy; particularly in oaks (USFWS 1992; Groce et al. 2010).

GCWA Population Dynamics

Pulich (1976) considered 31 counties located in Texas to be the nesting range of the GCWA: Bandera, Bell, Bexar, Blanco, Edwards, Erath, Comal, Coryell, Eastland, Bosque, Burnet, Gillespie, Hamilton, Hays, Hood, Johnson, Kendall, Kerr, Kimble, Kinney, Lampasas, Llano, Medina, Palo Pinto, Real, San Saba, Somervell, Stephens, Travis, Uvalde, and Williamson. He estimated the entire GCWA population in 1974 to be between 15,000 and 17,000 individuals (*Federal Register* 55, 53153–53160). In 1990, suitable habitat for the species was estimated throughout both urban and rural sections of Texas, and based on available breeding habitat, it was determined that Texas could only support 4,800 to 16,000 breeding pairs (USFWS 1990). It was estimated that only 2,200 to 4,600 breeding pairs remained in 1990

(NatureServe 2012). Morrison et al. (2010) reported range wide presence of 4,148,138 acres of potential GCWA habitat in 63,616 patches; the majority of which were less than 25 acres in size. Mean patch size was greatest in USFWS Recovery Regions 5, 6 and 8. The US 281 project area falls within GCWA recovery Region 6, which includes all or portions of Bexar, Bandera, Kerr, Kendall, Gillespie, Blanco, and Comal Counties. Using these habitat quantities and random point counts of singing males within habitat patches across the range, Morrison et al. (2010) estimated there were between 175,000 and 265,000 (mean = 220,000) adult male warblers in Texas in 2009. Further, they estimated anywhere from >370,000 to 300,000 total birds present in Texas, assuming 70 percent pairing success. The authors state that it is important to note that this range wide abundance estimate is an inferred or extrapolated number based upon GIS habitat estimates and point count verifications of occupancy (Morrison et al. 2010).

The 2006 range map published by the Texas Parks and Wildlife Department (TPWD) shows the GCWA as having a potential or known presence in 44 counties in Texas. Currently, the USFWS distribution map for the GCWA shows the species as being present in 37 counties in Texas on the Lampasas Cut Plain, the Edwards Plateau, and the Llano Uplift regions of Texas. The largest concentration of GCWAs is located in the Balcones Fault Zone (USFWS 1992). Numerous state and federal properties totaling over 126,000 acres are within the breeding range of the GCWA. These include parks, natural areas, and recreation areas owned by the State of Texas and military reservations, areas surrounding lakes and a national wildlife refuge owned by the federal government (USFWS 1992). Of the 29 properties owned by the state or federal government within the range of the GCWA, 16 have the GCWA present. In addition, other entities such as the Lower Colorado River Authority, counties (Bexar, Travis, Williamson, and Hays), and local municipalities such as the City of San Antonio also own property occupied by and/or managed for the GCWA (USFWS 1992).

GCWA Breeding/Reproduction

Researchers have found a wide variety in breeding territory sizes for the GCWA. Depending on the location and quality of habitat, GCWAs forage and nest in areas ranging in size from 5 to 20 acres per pair and males often return to the same nesting territory in subsequent years (USFWS 1992). Other Travis County studies have yielded territory sizes ranging from roughly 7 to 57 acres in size to 1 to 7 acres in size (Groce et al. 2010). It is important to note that, although territories are relatively small in size, recent studies indicate that much larger patch sizes are necessary for reliable occurrence (57 acres) and reproductive success (37–68 acres) (Arnold et al. 1996 and Butcher et al. 2010).

Female GCWAs begin building nests the first week of April. The nests consist of bark from the Ashe juniper tree that is secured by cobwebs and lined with feathers, grass, oak leaves, etc. When finished, the nest is a small, compact cup averaging 80 millimeters outside diameter and 50 millimeters outside depth (USFWS 1992). Pulich (1976) found that females usually place the nest in the upper two-thirds of Ashe juniper trees. While juniper trees are the most common tree used as nesting sites, the species has also been found to place their nests in cedar elms, various oaks, pecans, and other species (USFWS 1992). The female GCWA will perform all duties associated with incubation, which begins on the day before the last egg is laid and lasts 12 days. The female spends at least 75 percent of daylight hours on the nest (USFWS 1992).

Reasons for Listing GCWA and Current Threats

Historically, habitat loss and fragmentation were the major reasons for the decline in the GCWA population. A juniper eradication program was implemented in Texas in 1948, and from the 1950s to the 1970s, about 50 percent of the juniper acreage was cleared for pasture improvement and urbanization (USFWS 1990). Several counties that had GCWA habitat, including portions of Gillespie County and all of Mason County, no longer contained suitable habitat by the 1970s (USFWS 1990). The current threat to the Ashe juniper-oak woodland is urban sprawl, growth of urban areas with known GCWA populations such as the city of Austin, and the conversion of wooded areas to agricultural land. In 1992, 60 percent of the remaining warbler habitat was located in the fastest urbanizing counties of Texas such as Travis, Bexar, and Kerr (Sexton 1992). Because of the growth and development in this corridor, the greatest rate of GCWA habitat loss has occurred in the southern and eastern portions of the Edwards Plateau (USFWS 1990). According to the GCWA recovery plan other major threats to the species include the creation of impoundments for flood control and livestock, loss of winter and migration habitat, destruction of oaks by oak wilt, over-browsing by livestock and white-tailed deer, nest parasitism, and habitat fragmentation (USFWS 1992).

3.0 PRE-FIELD PREPARATION, HABITAT ASSESSMENT AND SURVEY METHODOLOGY

3.1 Habitat Determinations

The primary pre-field preparation for this survey was a review of the survey report by B&A, recent aerial photography, topographic maps and field reconnaissance. Right of entry was requested for all parcels within the habitat blocks identified by B&A. The habitat assessment conducted during 2009 originally delineated 13 blocks of potential habitat for the GCWA (B&A 2009). However, after the 2009 survey, blocks 4, 10, and 11 were dismissed as potential habitat due to a variety of reasons, primarily the removal of Ashe juniper and residential and commercial development within these areas. 2010 surveys resulted in further dismissal of blocks or portions of blocks as potential habitat due to similar reasons. On March 14, 2014, prior to the commencement of 2014 surveys, a field visit was conducted to reassess the habitat blocks. Approximately 32.14 acres of potential GCWA habitat was identified on the north end of the project limits and were included in Block 2. Clearing of Ashe juniper was noted in Block 9. **Table 1** below provides 2010 and 2014 summary information regarding parcels, acreages and habitat suitability for each of the original 13 habitat blocks.

Table 1. US 281 (Borgfeld Drive – Loop 1604) GCWA Habitat Block Summary – 2010 Survey						
Habitat Block	**# of Parcels Directly Surveyed**		**Acreage Directly Surveyed**		**Habitat Suitability/Disposition**	
	2010	**2014**	**2010**	**2014**	**2010**	**2014**
1	2		15.86	23.55	Suitable for survey	Suitable for survey
2	2		14.14	55.77	Suitable for survey	Suitable for survey
3	0		0	0.27	No response to right of entry (ROE) requests	Suitable for survey
4	0		0	0	Dismissed by B&A (residential in nature)	Dismissed by B&A (residential in nature)
5	0		0	3.88	No response and/or denial to ROE letters	Suitable for survey
6	2		11.78	8.94	13 acres dismissed by H&C due to complete Ashe juniper removal; remainder suitable for survey	Suitable for survey
7	1		4.92	10.16	Suitable for survey	Suitable for survey
8	0		0	4.14	ROE problematic (late, conditional – unreasonable insurance requirements)	Suitable for survey
9	11		77.26	12.43	Suitable for survey but significant oak die-off occurring due to stress-induced hypoxylon canker	Suitable for survey but Ashe juniper removal noted
10	0		0	0	Dismissed by B&A (surrounded by commercial development); No ROE granted	Dismissed by B&A (complete Ashe juniper removal); No ROE granted
11	0		0	0	Dismissed by B&A (complete Ashe juniper removal); No ROE granted	Dismissed by B&A (complete Ashe juniper removal)
12	0		0	0	42.43 acres dismissed by H&C due to complete Ashe juniper removal	Dismissed by Hicks during 2010 survey due to complete Ashe juniper removal
13	0		0	5.74	No response to ROE requests	Suitable for survey
Totals:	18		123.98	124.88		

3.2 Presence/Absence Surveys

Presence/absence surveys for the GCWA were performed on all the habitat areas delineated during the habitat determination and followed the procedures outlined in the 2009 USFWS GCWA survey protocol and the stipulations detailed in our 10(a)(1)(A) Scientific Permit requirements. GCWA surveys were conducted between March 15 and May 31. Five visits were made to each parcel, with no more than one visit within a five-day period. A sixth visit utilizing play-back tapes was conducted to confirm absence. Surveys were conducted during favorable weather conditions and lasted at least five hours for the 125 acres of potential habitat. A total of 54 properties within nine of the 13 original habitat blocks granted

access to conduct surveys. Of these, 47 were within the habitat blocks deemed suitable for survey (blocks 1–3, 5–9, and 13). Areas where right of entry was granted were accessed on foot and, where possible, areas that were not granted right of entry were surveyed from the existing right of way. Copies of the GCWA presence/absence field data forms, which include data on the weather conditions during the surveys, are included in **Attachment 3**.

5.0 GOLDEN-CHEEKED WARBLER SURVEY RESULTS AND DISCUSSION

A total of six survey visits were made by ecologists familiar with GCWA habitat, calls, and behavior. As shown below on **Table 2**, approximately 54.27 person hours were expended in the survey effort. A USFWS and TPWD permitted staff member was present during each of these visits. The Spring 2014 survey efforts resulted in no documentation of GCWAs or territories within the study area. A sixth visit utilizing play-back calls confirmed the absence of this species within the survey area.

Table 2. US 281 Golden-cheeked Warbler Survey Effort

Date of Survey	Observers	Hours Surveyed/Observer	Total Person Hours
3/28/2014	Julie LeClair	7.00	7.00
4/4/2014	John Kuhl	7.00	7.00
4/17/2014	John Kuhl, Julie LeClair	4.75	9.5
4/25/2014	John Kuhl, Julie LeClair	5.22	10.44
5/09/2014	John Kuhl, Julie LeClair	4.50	9.00
5/22/2014	John Kuhl, Julie LeClair	5.66	11.33
Total			54.27

Forty-five other avian species, representing 24 families, were detected during the survey. A list of the avian species and other wildlife documented in the study area during the 2014 survey is provided in **Attachment 4**. Other wildlife species observed during the survey included northern cricket frog (*Acris crepitans*), southern leopard frog (*Rana sphenocephala*), Texas spiny lizard (*Sceloperus olivaceous*), green anole (*Anolis carolinensis*), eastern cottontail (*Sylvilagus floridanus*), rock squirrel (*Spermophilus variegatus*), *fox* squirrel (*Sciurius niger*), raccoon (*Procyon lotor*) and white-tailed deer (*Odocoileus virginiana*).

6.0 SUMMARY

A previous habitat assessment by B&A found no GCWA habitat in the existing US 281 ROW but identified 13 blocks of potential GCWA habitat in either proposed ROW and/or a 500-foot wide corridor on either side of the proposed ROW. B&A recommended dismissal of blocks 4, 10, and 11 due to surrounding development and/or habitat removal (removal of all Ashe junipers). H&C ecologists agreed with these findings and dismissed a portion of Block 6 and all of Block 12 due to habitat removal which occurred prior to the 2010 survey. A field visit conducted prior to the commencement of 2014 surveys resulted in the addition of approximately 32.14 acres of potential habitat to Block 2 on the north end of

the project limits. Additionally, Ashe juniper clearing was noted in Block 9. During the 2014 breeding season, a rigorous direct survey was conducted on approximately 125 acres in blocks 1–3, 5–9, and 13 and surveyors checked all additional habitat available from public rights of way during the effort. After three years worth of effort, no GCWA have been detected and habitat quantity and quality losses continue due to current and pending development and both man-induced and natural woodland losses in the corridor. Ashe juniper clearing has taken place in blocks 6, 9, 11, and 12 and significant oak mortality has been observed on the west side of US 281 due to hypoxylon canker; a naturally occurring fungal condition particularly expressed in oaks during periods of environmental stress. In addition, nesting deterrents for the GCWA are prevalent and likely increasing due to urbanization, noise, and the prevalence of typical nest predator and social parasite species such as the Western Scrub Jay, Great-tailed Grackle and Brown-headed Cowbird. Given the negative survey findings to date and increasing downward spiral of habitat quality, it does not seem likely that the GCWA will utilize the project corridor.

7.0 LITERATURE CITED

Arnold, K.A., C.L. Coldren, and M.L. Fink. 1996. The interactions between avian predators and golden-cheeked warblers in Travis County. Texas Transportation Institute. Texas A&M University System. Texas Department of Transportation. Report 1983-2. College Station, Texas, USA.

Baccus, J.T., M.E. Tolle, and J.D. Cornelius. 2007. Response of golden-cheeked warblers (*Dendroica chrysoparia*) to wildfires at Fort Hood, Texas. Texas Ornithological Society.

Blanton & Associates, Inc. 2009. Habitat Assessments for the golden-cheeked warbler and black-capped vireo and presence-absence surveys for the golden-cheeked warbler within the study area of the Alamo Regional Mobility Authority's proposed improvements to US 281 from Borgfeld Road to Loop 1604 in Bexar County, Texas.

Butcher, J.A., M.L. Morrison, D. Ransom, R.D. Slack and R.N. Wilkins. 2010. Evidence of a minimum patch size threshold of reproductive success in an endangered songbird. *Journal of Wildlife Management* 74(1): 133-139.

Campbell, L. 2003. Endangered and threatened animals of Texas: their life history and management. Texas Parks and Wildlife Department, Austin, Texas.

Coldren, C.L. 1998. The effects of habitat fragmentation on the golden-cheeked warbler. Dissertation, Texas A&M University, College Station.

Federal Register, http://www.gpoaccess.gov/fr/index.html, 1994–2007

Gould, F.W., G.O. Hoffman, and C.A. Rechenthin. 1960. Vegetational Areas of Texas. Texas A&M University, Texas Agricultural Experiment Station Leaflet No. 492.

Groce, J.E., H.A. Mathewson, M.L. Morrison and N. Wilkins. 2010. Scientific evaluation for the 5-year status review of the golden-cheeked warbler. Prepared for the U.S. Fish and Wildlife Service by the Institute of Renewable Natural Resources and Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station.

Guilfoyle, M.P. 2002. Black-capped vireo and golden-cheeked warbler populations potentially impacted by USACE reservoir operations. EMRRP Technical Notes Collection (TNEMRRP-S1-28). U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

Hicks & Company. 2010. Golden-cheeked Warbler Survey – Alamo Regional Mobility Authority's Proposed Improvements to US 281 (Borgfeld Road to Loop 1604 – Bexar County, Texas).

Klassen, J.A. 2011. Canopy characteristics affecting avian reproductive success: the golden-cheeked warbler. Thesis submitted to the Office of Graduate Studies of Texas A&M University, College Station.

Kroll, J.C. 1980. Habitat requirements of the golden-cheeked warbler: management implications. Journal of Range Management 33(1): 60–65.

Ladd, C.G. 1985. Nesting habitat requirements of the Golden-cheeked warbler. Master's thesis, Southwest Texas State University, San Marcos.

Ladd, C., and Gass, L. 1999. Golden-cheeked warbler (Dendroica chrysoparia). The Birds of North America, No. 420. A. Poole and F. Gill, eds. The Birds of North America, Inc., Philadelphia, Pennsylvania.

Magness, D.R., R.N. Wilkins, and S.J. Hejl. 2006. Quantitative relationships among golden-cheeked warbler occurrence and landscape size, composition, and structure. Wildlife Society Bulletin 34:473–479

McMahan, C.A., R.G. Frye, and K.L. Brown, 1984. The vegetation types of Texas. Texas Parks and Wildlife Department, Austin.

Morrison, M.L., R.N. Wilkins, B.A. Collier, J.E. Groce, H.A. Mathewson, T.M. McFarland, A.G. Snelgrove, R.T. Snelgrove, and K.L. Skow. 2010. Golden-Cheeked Warbler Population Distribution and Abundance. Texas A&M Institute of Renewable Natural Resources, College Station.

NatureServe. 2012. NatureServe Explorer: An Online Encyclopedia of Life. http://www.natureserve.org/explorer (accessed June 12, 2012).

Pulich, W.M. Sr. 1976. The golden-cheeked warbler: a bioecological study. Texas Parks and Wildlife Department, Austin.

Sexton, C. 1992. The golden-cheeked warbler. Birding. December 1992:373–6.

U.S. Department of Agriculture-Soil Conservation Service (NRCS). 1984. Web Soil Survey. Hays County, Texas. Accessed May 22, 2013.

U.S. Fish and Wildlife Service (USFWS). 1990. Final Rule to List the Golden-cheeked Warbler as Endangered. *Federal Register* 55, 53153–53160.

———. 1992. Golden-cheeked Warbler (*Dendroica chrysoparia*) Recovery Plan. Albuquerque, New Mexico.

ATTACHMENT 1

FIGURES

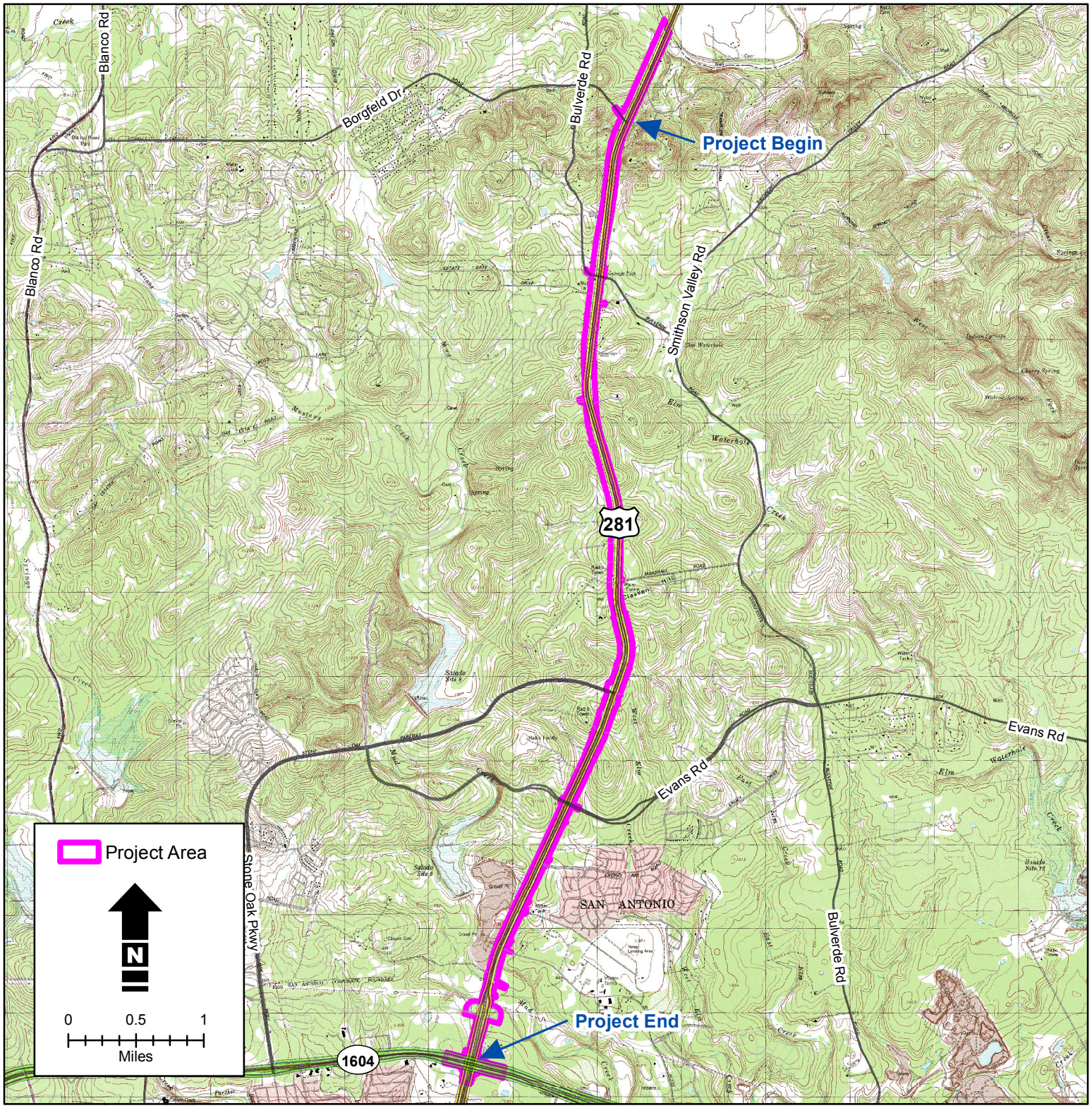
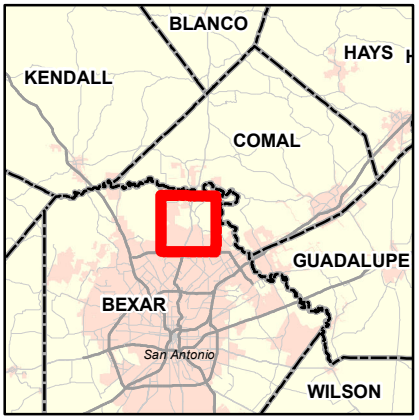
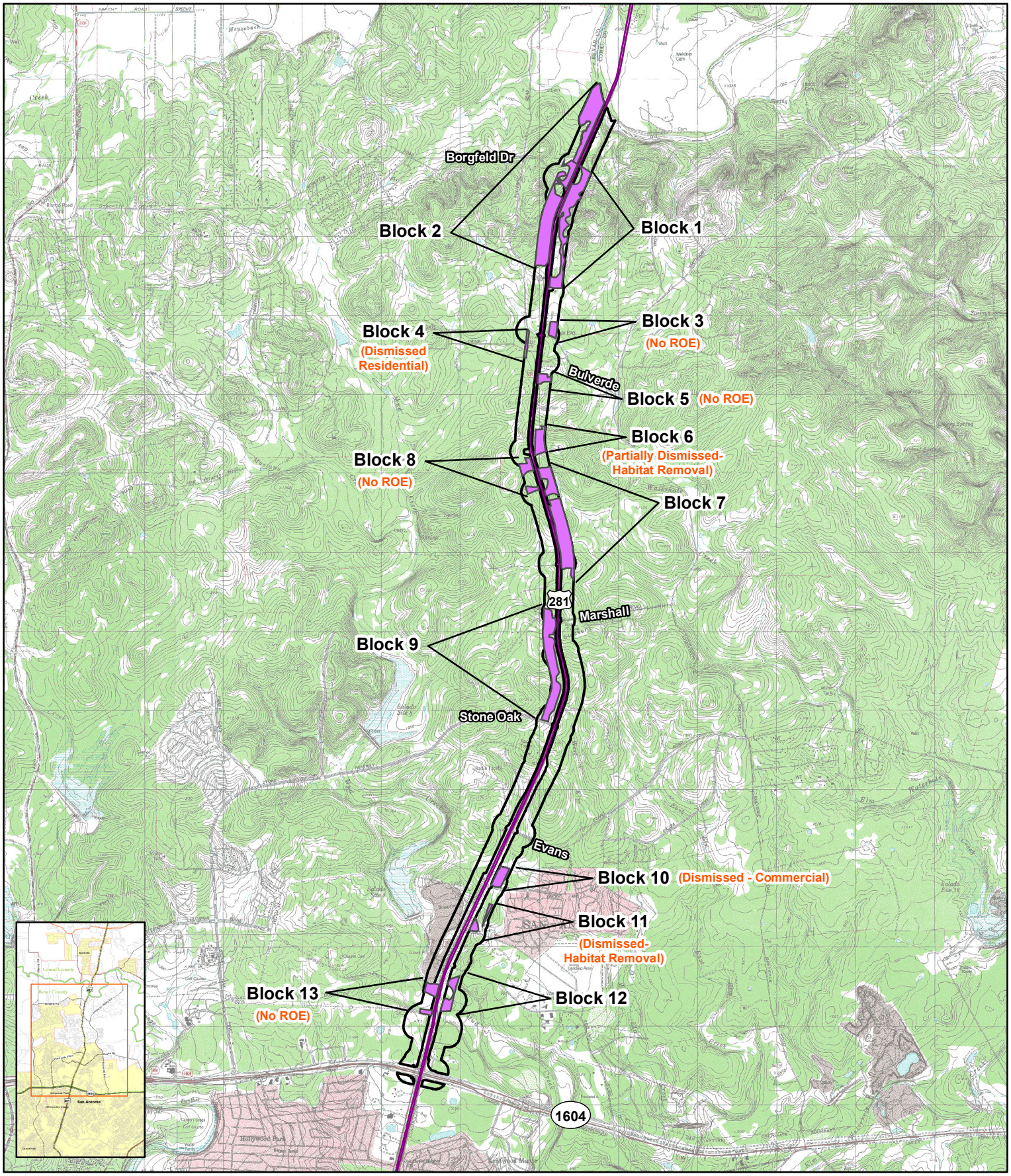


Figure 1
Project Location
US 281 From Loop 1604 to Borgfeld Drive
Bexar County, TX

USGS 7.5-minute Topographic Quadrangles:
Bulverde, Longhorn, Camp Bullis & Castle Hills, Tx





N

0 0.5 1
Miles

1 inch = 1 mile

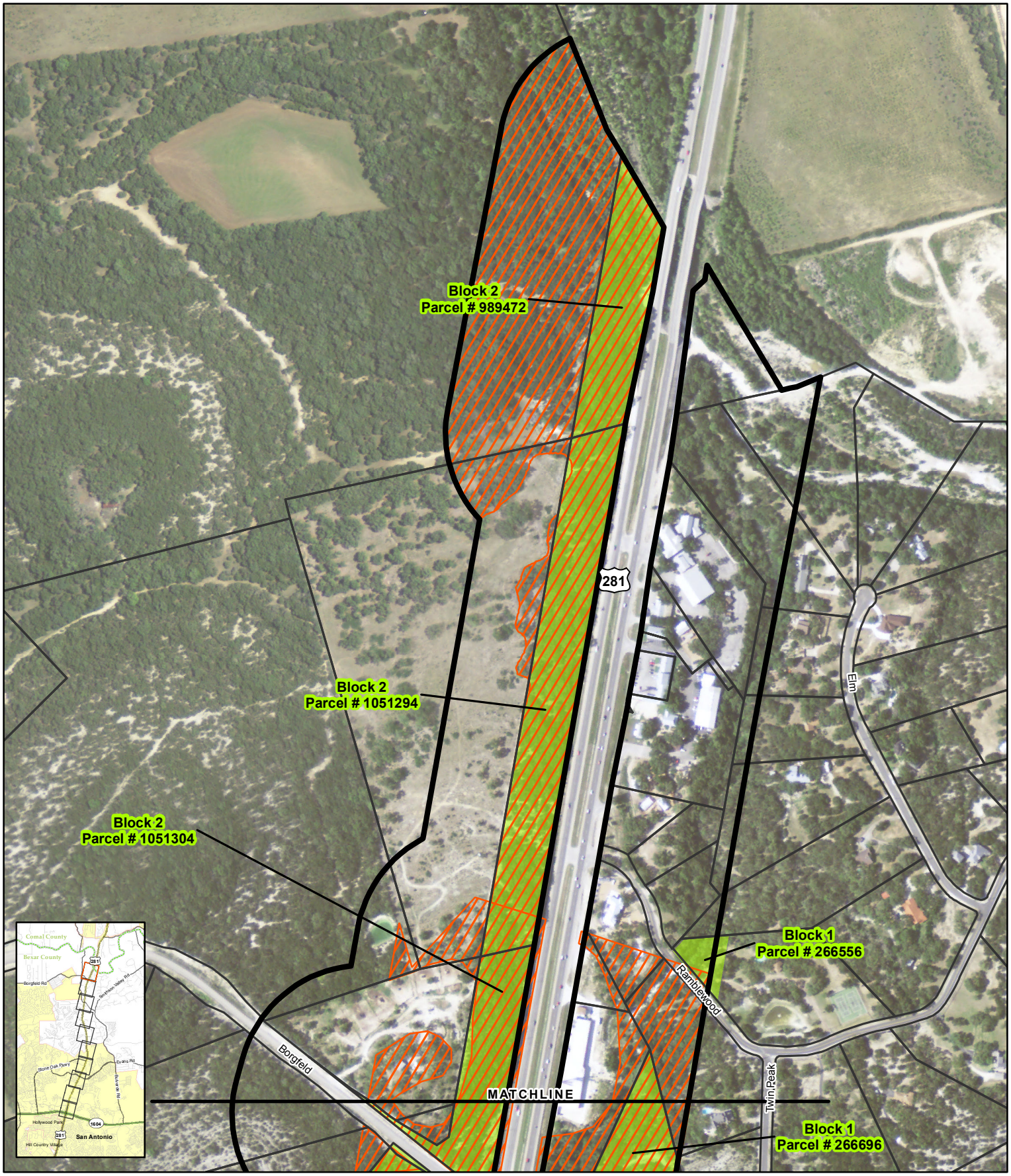
Figure 2

US 281 From Loop 1604 to Borgfeld Drive
Potential GCWA Habitat Blocks
on Topographic Base

Key to Features

- Study Area (500 ft. Buffer from Proposed ROW)
- Golden-cheeked Warbler Habitat Blocks

Base Map: USGS 7.5 Minute Quadrangles : Bulverde, Longhorn, Camp Bullis & Castle Hills, Tx



N

0 250 500
Feet

1 inch = 500 feet

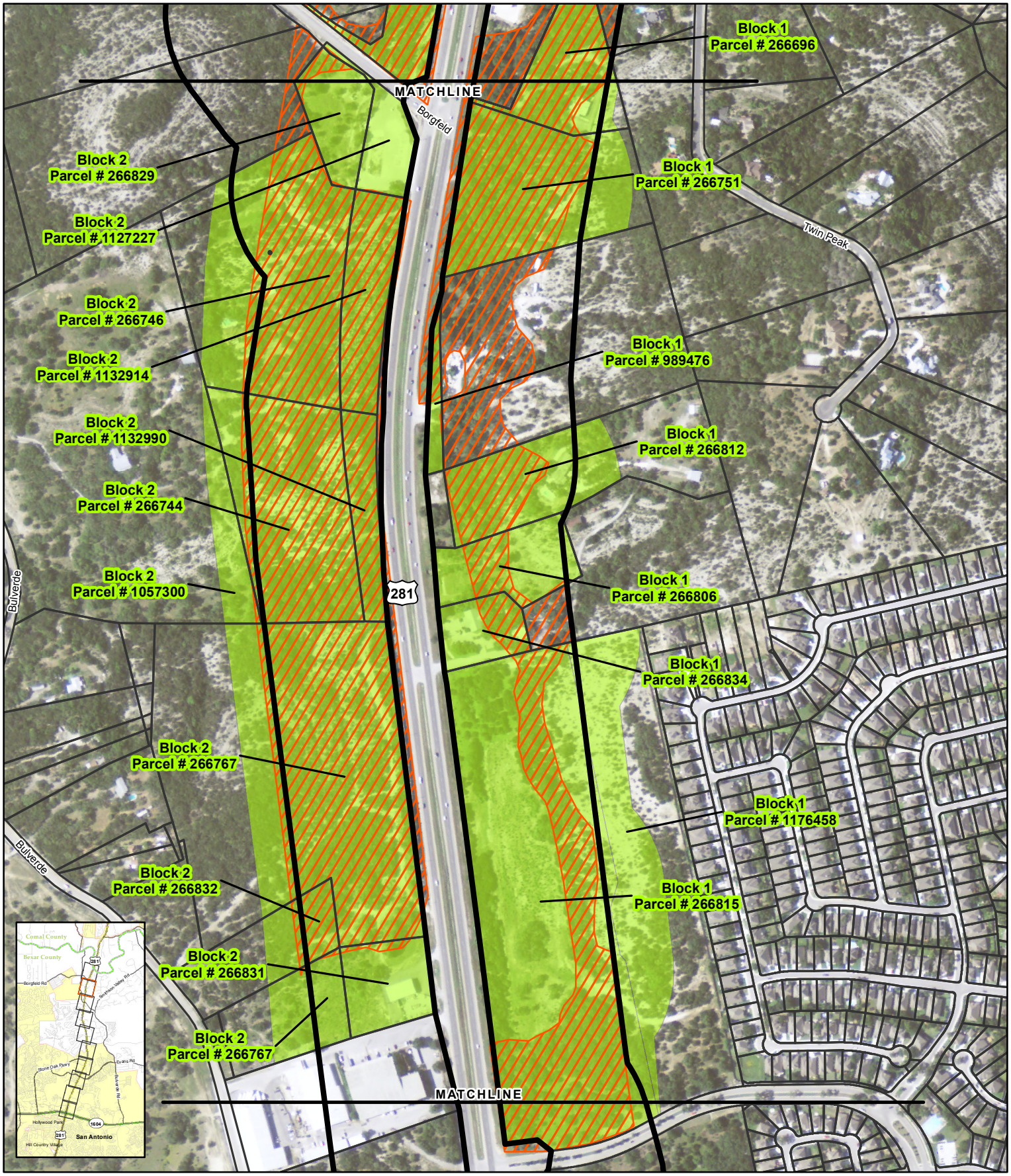
Figure 3.1

US 281 From Loop 1604 to Borgfeld Drive
Potential GCWA Habitat Blocks
and Right of Entry Status

Key to Features

- Parcel Boundaries
- Study Area (500 ft. Buffer from Proposed ROW)
- Golden-cheeked Warbler Habitat
- Right of Entry Granted

Base Map: 2012 NAIP Aerial Photography



N

0 250 500
Feet

1 inch = 500 feet

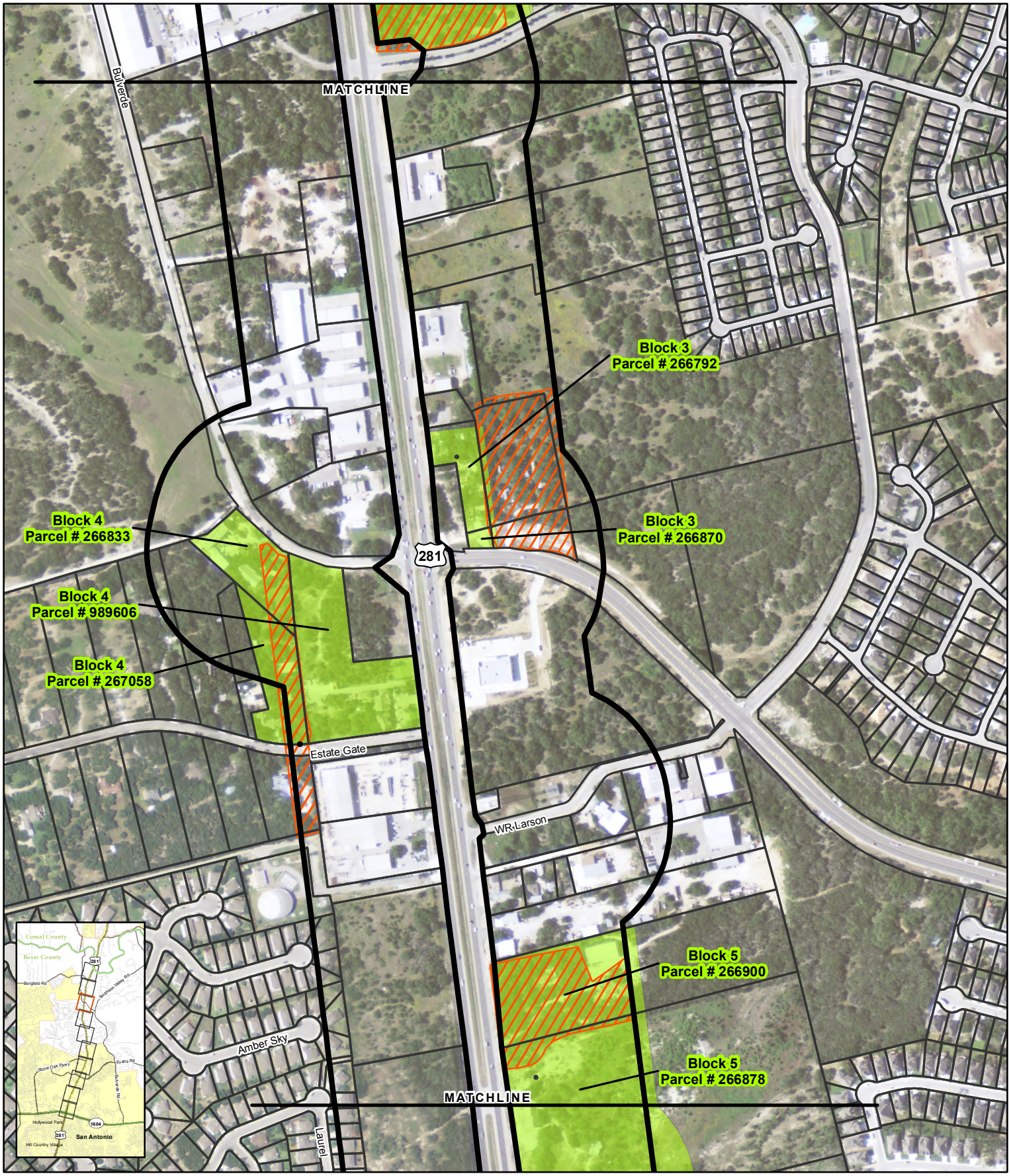
Figure 3.2

US 281 From Loop 1604 to Borgfeld Drive
Potential GCWA Habitat Blocks
and Right of Entry Status

Key to Features

- Parcel Boundaries
- Study Area (500 ft. Buffer from Proposed ROW)
- Golden-cheeked Warbler Habitat
- Right of Entry Granted

Base Map: 2012 NAIP Aerial Photography



N

0 250 500
Feet

1 inch = 500 feet

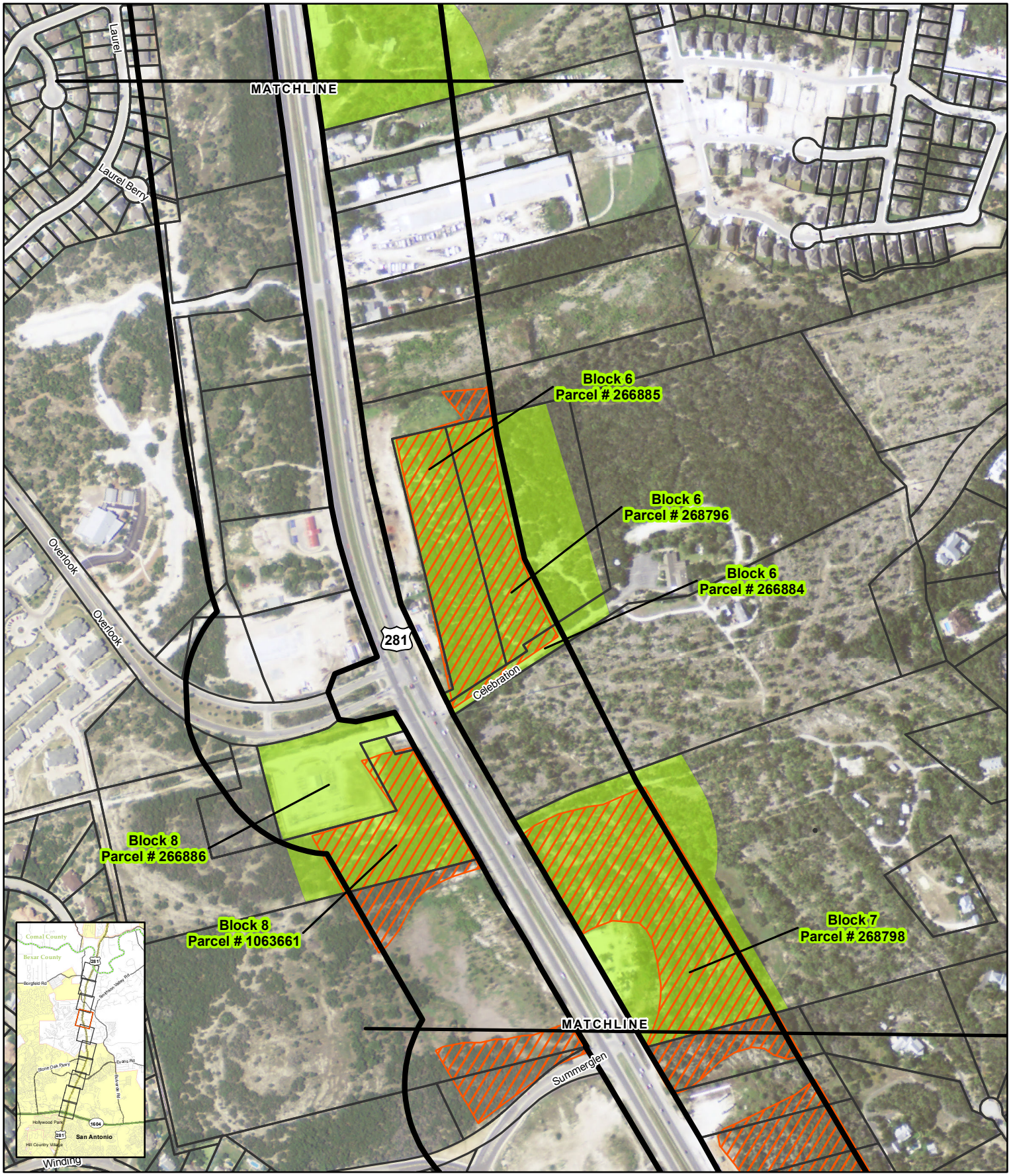
Figure 3.3

US 281 From Loop 1604 to Borgfeld Drive
Potential GCWA Habitat Blocks
and Right of Entry Status

Key to Features

- Parcel Boundaries
- Study Area (500 ft. Buffer from Proposed ROW)
- Golden-cheeked Warbler Habitat
- Right of Entry Granted

Base Map: 2012 NAIP Aerial Photography



N

0 250 500
Feet

1 inch = 500 feet

Figure 3.4

US 281 From Loop 1604 to Borgfeld Drive
Potential GCWA Habitat Blocks
and Right of Entry Status

Key to Features

- Parcel Boundaries
- Study Area (500 ft. Buffer from Proposed ROW)
- Golden-cheeked Warbler Habitat
- Right of Entry Granted

Base Map: 2012 NAIP Aerial Photography

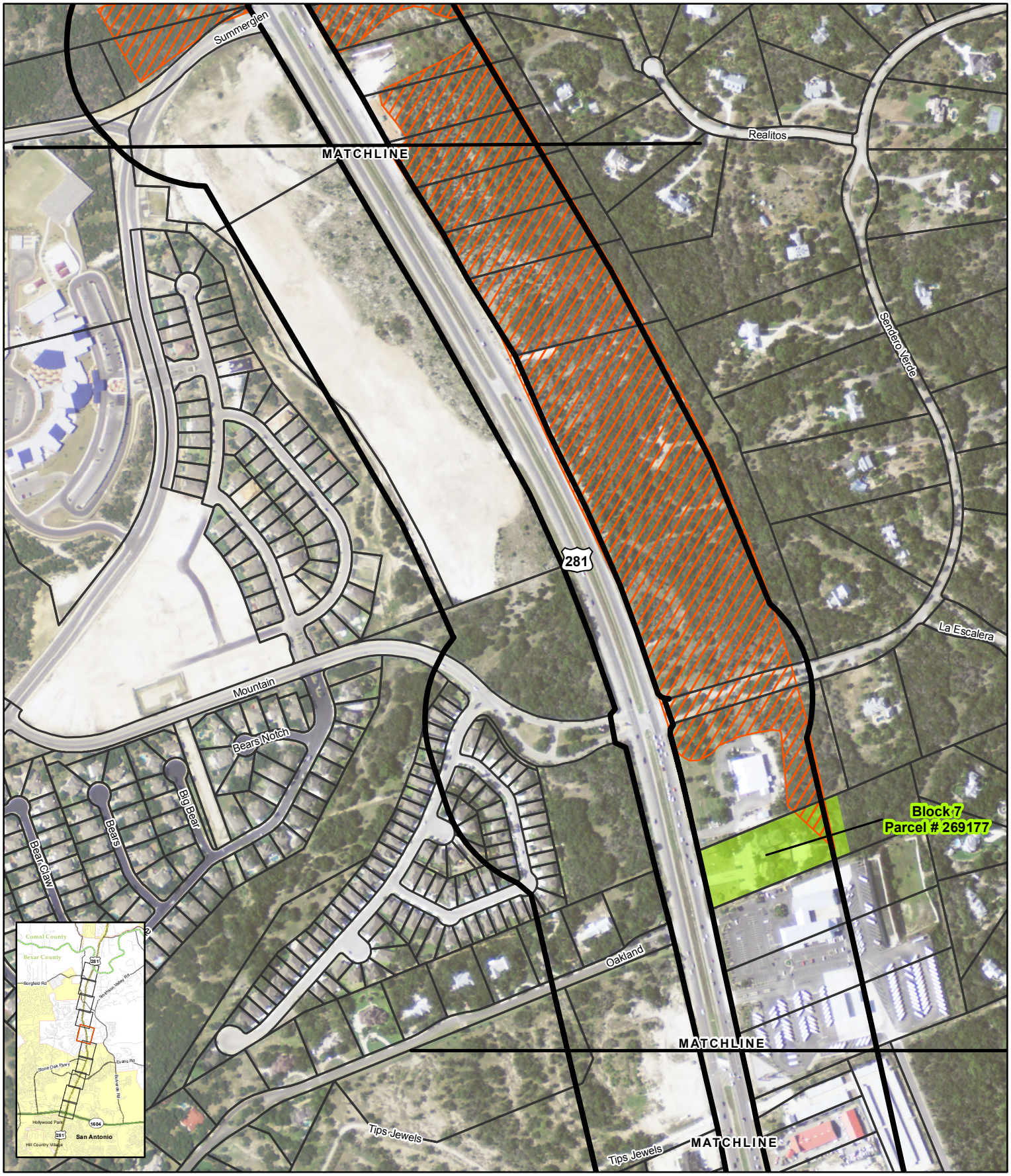


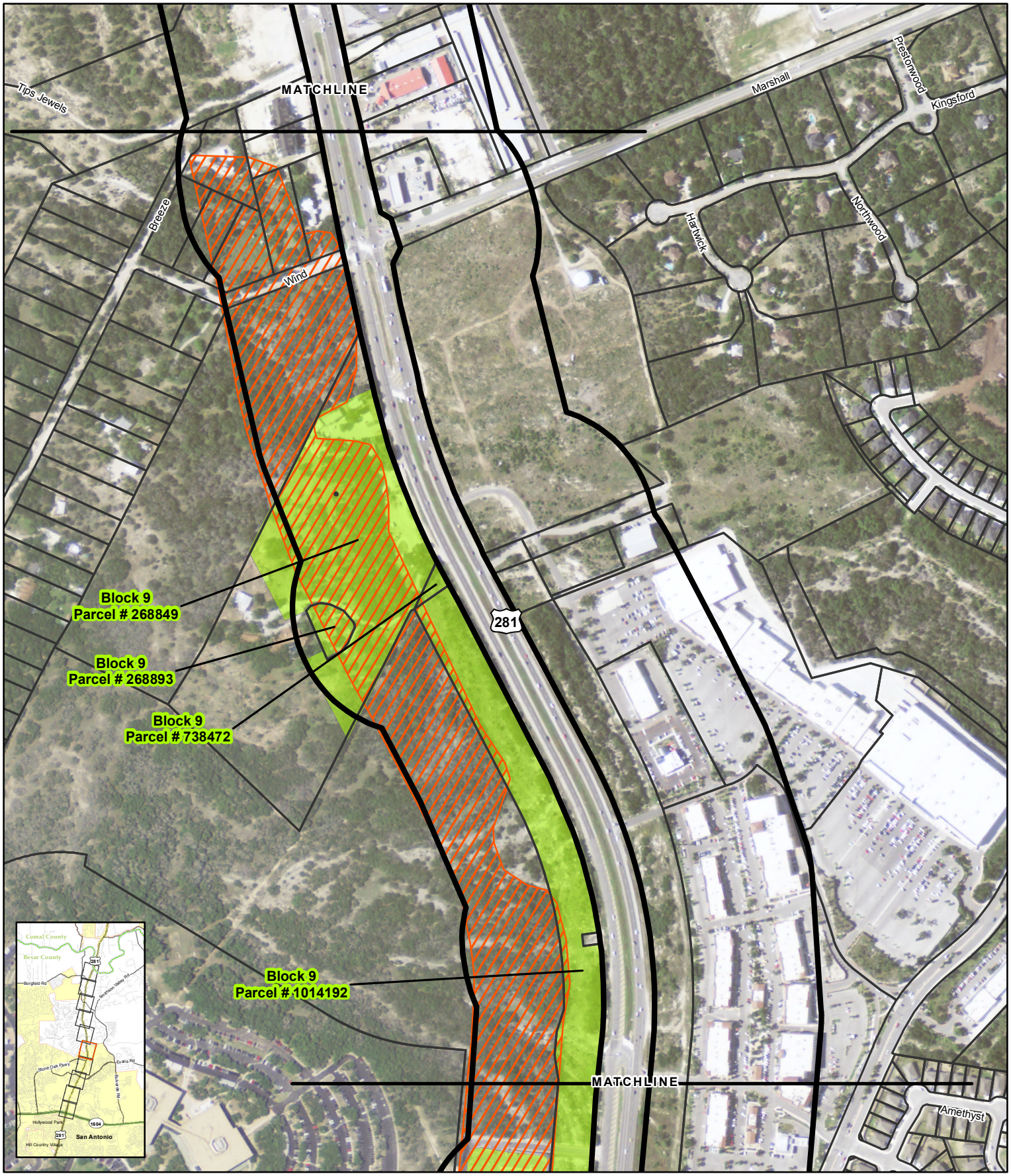
Figure 3.5

US 281 From Loop 1604 to Borgfeld Drive
Potential GCWA Habitat Blocks
and Right of Entry Status

Key to Features

- Parcel Boundaries
- Study Area (500 ft. Buffer from Proposed ROW)
- Golden-cheeked Warbler Habitat
- Right of Entry Granted

Base Map: 2012 NAIP Aerial Photography



N

0 250 500
Feet

1 inch = 500 feet

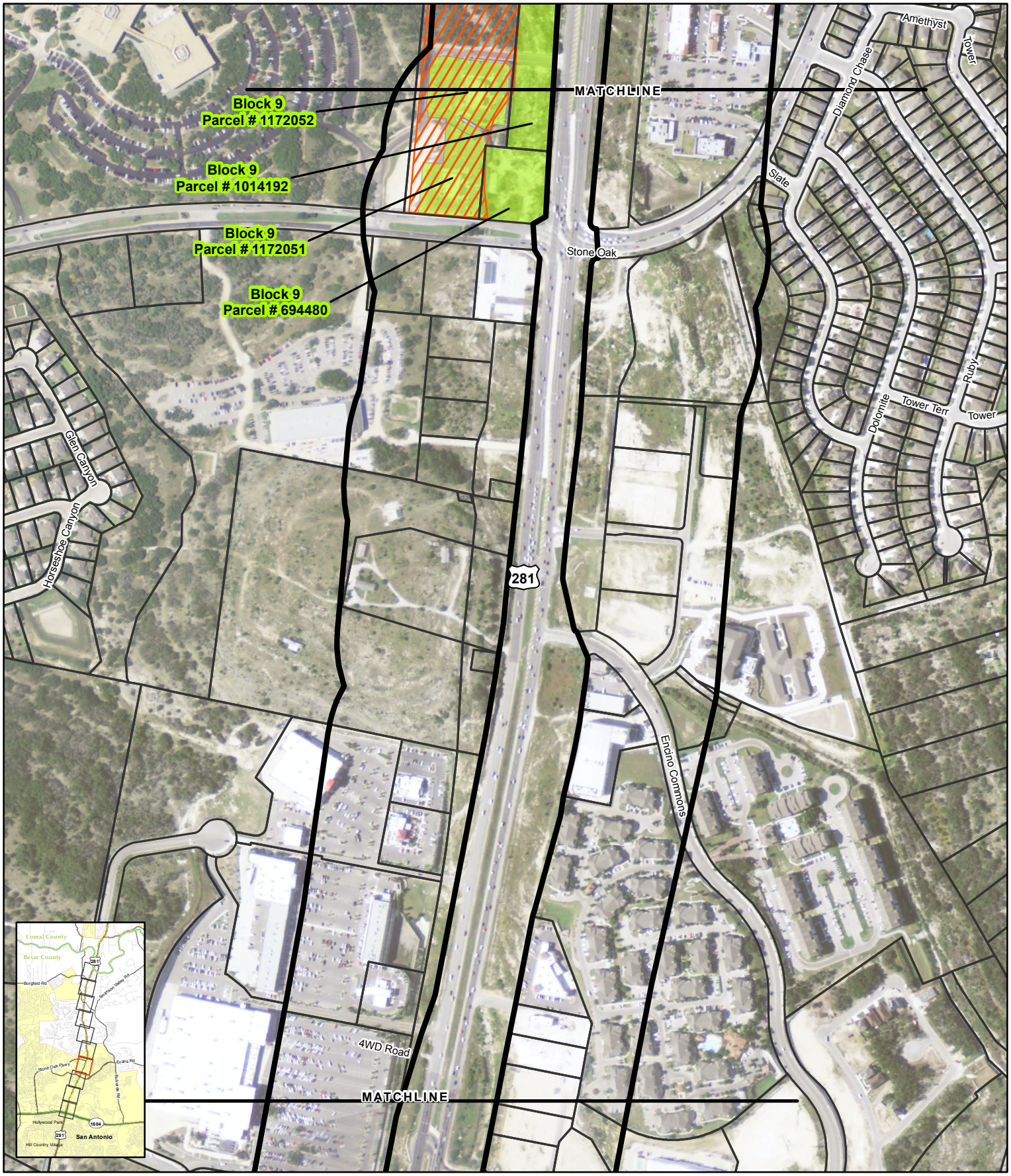
Figure 3.6

US 281 From Loop 1604 to Borgfeld Drive
Potential GCWA Habitat Blocks
and Right of Entry Status

Key to Features

- Parcel Boundaries
- Study Area (500 ft. Buffer from Proposed ROW)
- Golden-cheeked Warbler Habitat
- Right of Entry Granted

Base Map: 2012 NAIP Aerial Photography



N

0 250 500
Feet

1 inch = 500 feet

Figure 3.7

US 281 From Loop 1604 to Borgfeld Drive
Potential GCWA Habitat Blocks
and Right of Entry Status

Key to Features

- Parcel Boundaries
- Study Area (500 ft. Buffer from Proposed ROW)
- Golden-cheeked Warbler Habitat
- Right of Entry Granted

Base Map: 2012 NAIP Aerial Photography

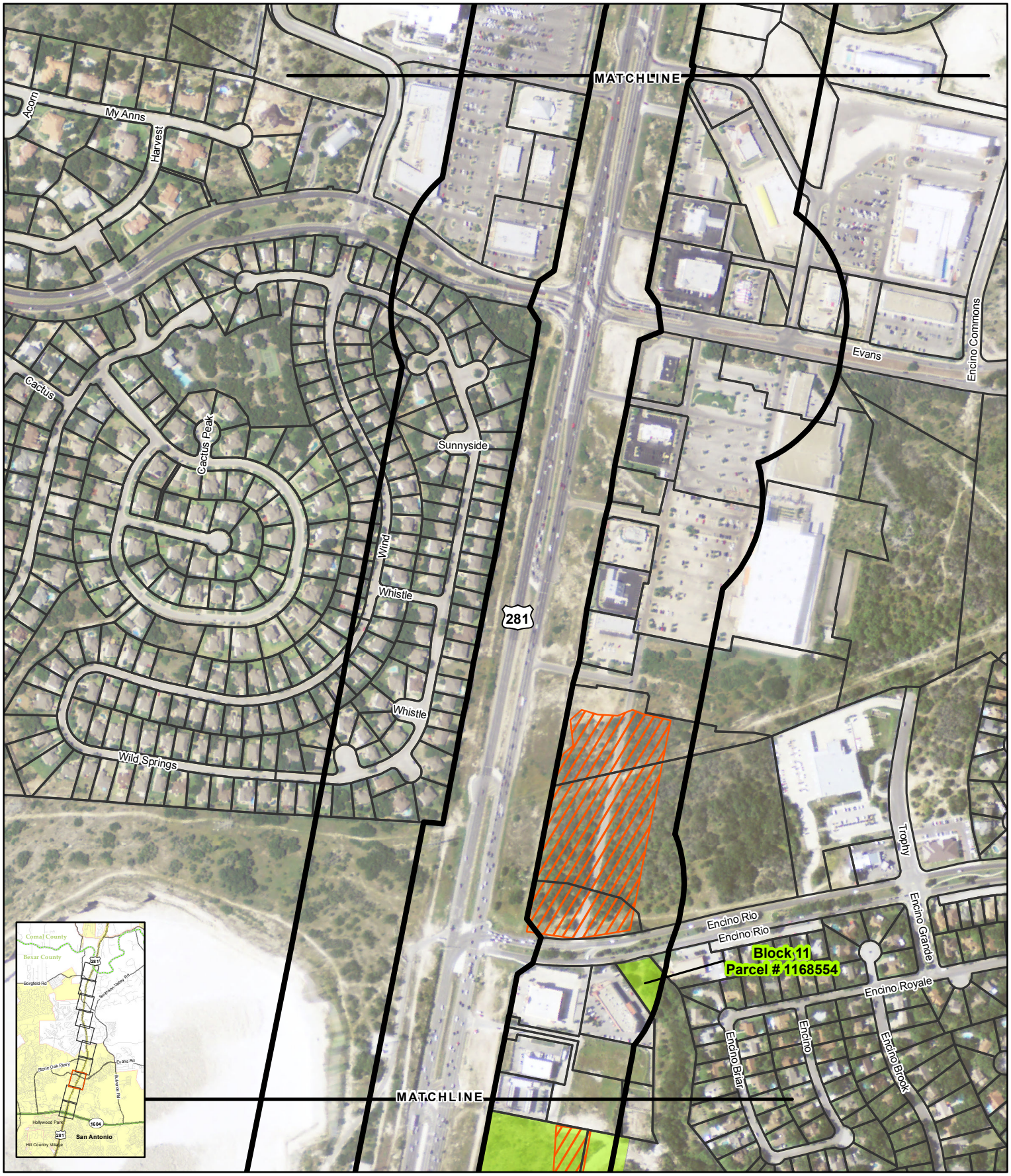


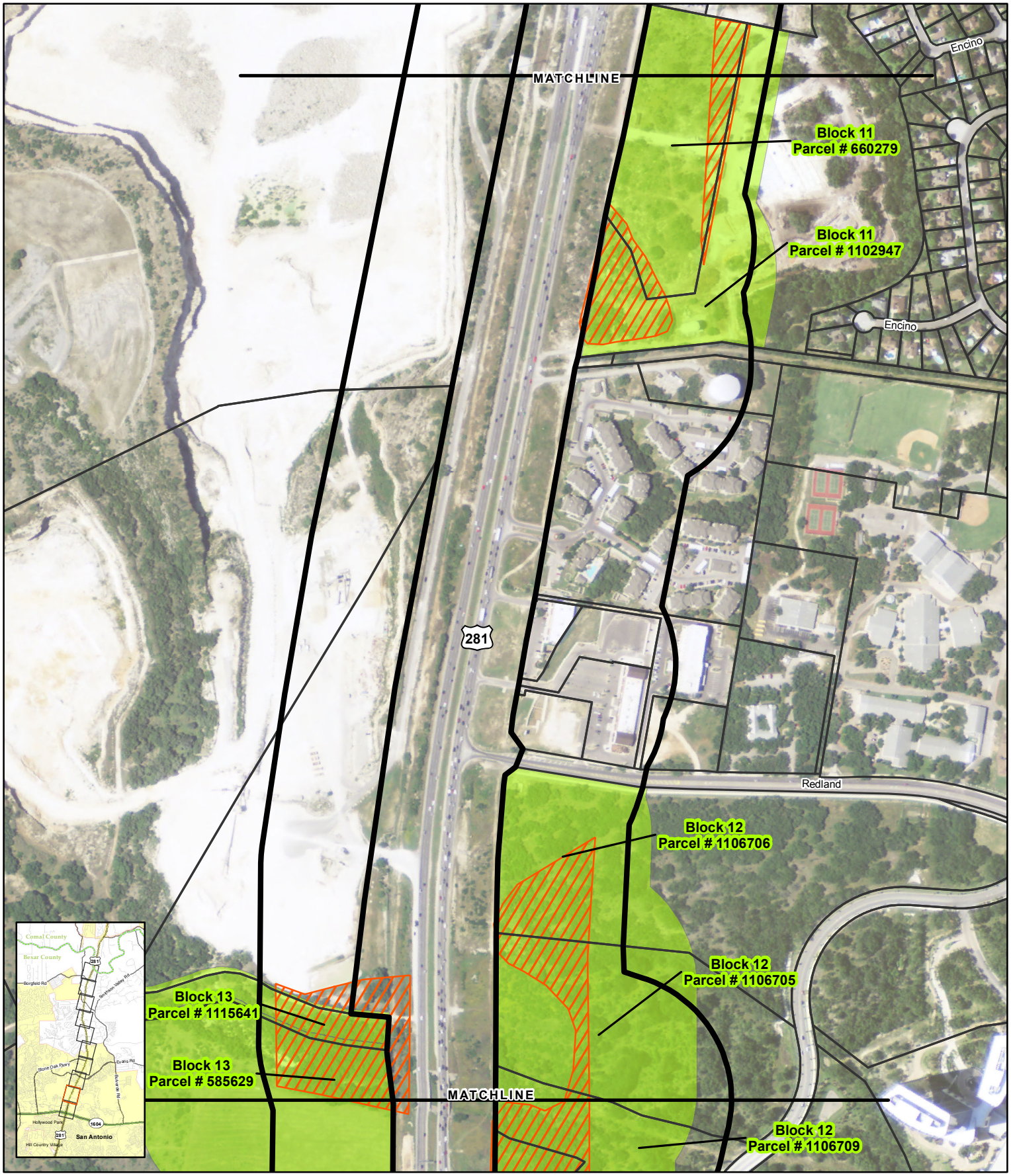
Figure 3.8

US 281 From Loop 1604 to Borgfeld Drive
Potential GCWA Habitat Blocks
and Right of Entry Status

Key to Features

- Parcel Boundaries
- Study Area (500 ft. Buffer from Proposed ROW)
- Golden-cheeked Warbler Habitat
- Right of Entry Granted

Base Map: 2012 NAIP Aerial Photography



N

0 250 500
Feet

1 inch = 500 feet

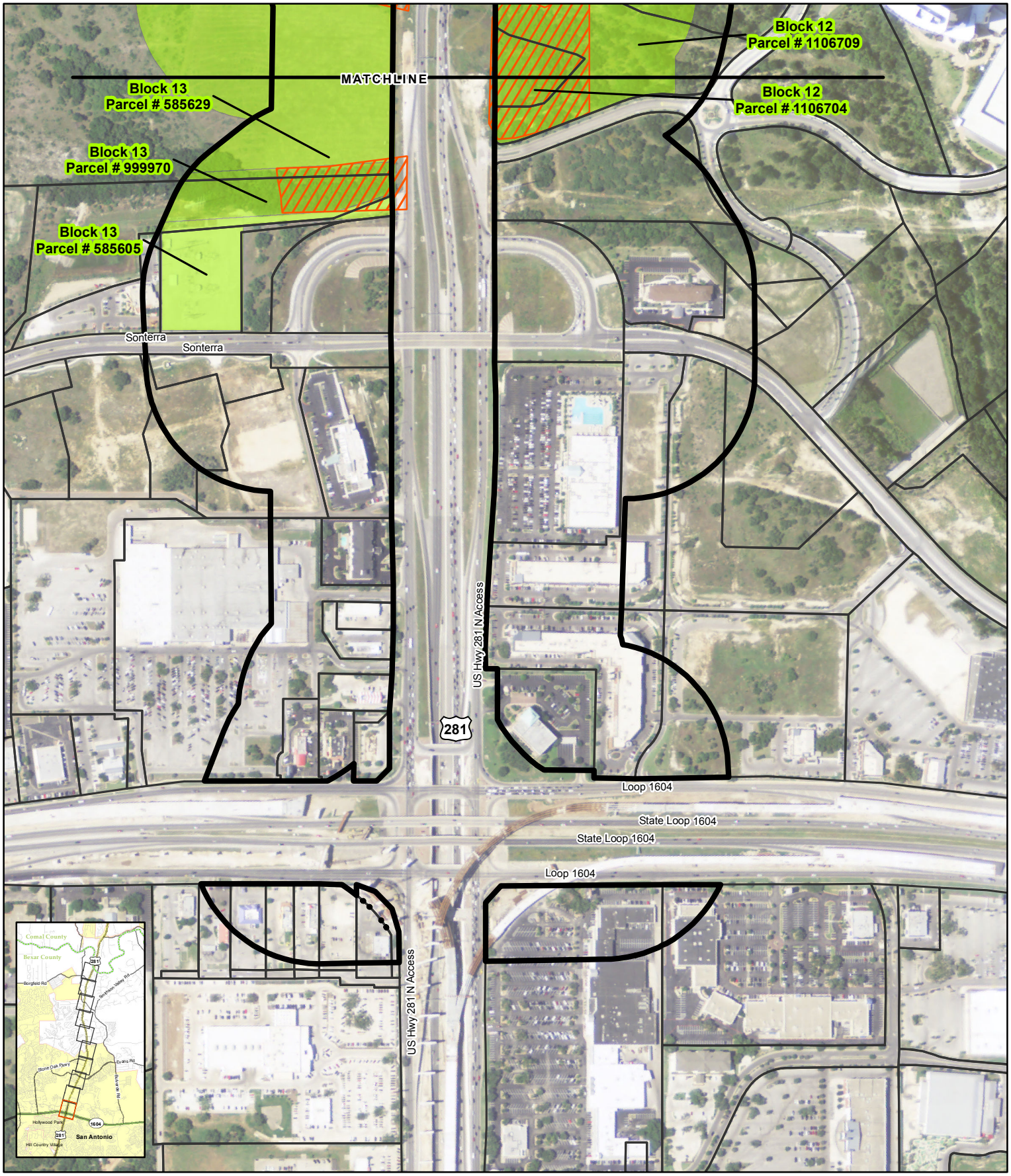
Figure 3.9

US 281 From Loop 1604 to Borgfeld Drive
Potential GCWA Habitat Blocks
and Right of Entry Status

Key to Features

- Parcel Boundaries
- Study Area (500 ft. Buffer from Proposed ROW)
- Golden-cheeked Warbler Habitat
- Right of Entry Granted

Base Map: 2012 NAIP Aerial Photography



0 250 500
Feet

1 inch = 500 feet

Figure 3.10

US 281 From Loop 1604 to Borgfeld Drive
Potential GCWA Habitat Blocks
and Right of Entry Status

Key to Features

- Parcel Boundaries
- Study Area (500 ft. Buffer from Proposed ROW)
- Golden-cheeked Warbler Habitat
- Right of Entry Granted

Base Map: 2012 NAIP Aerial Photography

ATTACHMENT 2

SITE PHOTOS

Photo 1. View of potential habitat added to Block 2, south of Cibolo Creek, looking north

Photo 2. View of potential habitat west of US 281, south of Borgfeld Drive, looking north

Photo 3. View of potential habitat east of US 281, south of Celebration Drive, looking east

Photo 4. View of potential habitat east of US 281, south of Ramblewood Street, looking north

Photo 6. View of Ashe juniper clearing in Block 9, looking west

ATTACHMENT 3

SURVEY DATA FORMS

GOLDEN-CHEEKED WARBLER/ BLACK-CAPPED VIREO FIELD DATA FORM

Study Site	US 281	Weather Conditions		
Tract #			Begin	End
Visit #	1	Temperature	69.1	87.0
Date	3/28/14	Cloud Cover	cloudy	none
Observer	J Leclair	Precipitation	none	none
Time Begin-End	7:14am - 2:18pm	Wind Speed/Direction	4.4 mph	6.1 mph

General Survey Notes (e.g., Additional wildlife information, etc.)

BLVI CACH NOMO
WEDO TUTI RCSP
MODO BCTI NOCA
LBWO CARW GTGR
EAPH BEVI BHCO

Rock squirrel

Species	Song Type	Male #	Female #	Juv #	Distance from Observer (feet)	Direction from Observer (degrees)	Time of Observation	Observation Type (Auditory or Visual)	Observation Mapped or GPS recorded (Yes or No)

Bird Observation Notes – (Age (HY, SY, ASY), behavior observed, etc.)

NO GCWA detected

GOLDEN-CHEEKED WARBLER/ BLACK-CAPPED VIREO FIELD DATA FORM

Study Site	US 281	Weather Conditions		
Tract #			Begin	End
Visit #	2	Temperature	54.0	69.0
Date	4/4/14	Cloud Cover	partly cloudy	none
Observer	J Kuhl	Precipitation	none	none
Time Begin-End	7:00am - 2:00pm	Wind Speed/Direction	6-8 mph N	8-10 mph N

General Survey Notes (e.g., Additional wildlife information, etc.)

WWDO PUMA BEWR NOCH
MODO BARS CANW RUBL
BCHU CACH NOMO GTTO R
STFL BCTI EUST HOFI
AMCR CARW LEGO

Species	Song Type	Male #	Female #	Juv #	Distance from Observer (feet)	Direction from Observer (degrees)	Time of Observation	Observation Type (Auditory or Visual)	Observation Mapped or GPS recorded (Yes or No)

Bird Observation Notes – (Age (HY, SY, ASY), behavior observed, etc.)

No GCWA detected

GOLDEN-CHEEKED WARBLER/ BLACK-CAPPED VIREO FIELD DATA FORM

Study Site	US 281	Weather Conditions		
Tract #			Begin	End
Visit #	3	Temperature	100.5	107.0
Date	4/17/14	Cloud Cover	cloudy	cloudy
Observer	Hunt/Hechir	Precipitation	none	none
Time Begin-End	7:00am - 11:45am	Wind Speed/Direction	0mph	1mph E

General Survey Notes (e.g., Additional wildlife information, etc.)

BLVI BCHU RCKI SUTA
RTHA WEVI NOMO NOCA
CRCA BCTI NAWA GTOR
MODO CARW RCSP BHCO
GRKO BEWR CHSP HOFI

Deer
Rock Squirrel
Fox Squirrel
Raccoon Scat
Cricket frog

Species	Song Type	Male #	Female #	Juv #	Distance from Observer (feet)	Direction from Observer (degrees)	Time of Observation	Observation Type (Auditory or Visual)	Observation Mapped or GPS recorded (Yes or No)

Bird Observation Notes – (Age (HY, SY, ASY), behavior observed, etc.)

No GCWA detected

GOLDEN-CHEEKED WARBLER/ BLACK-CAPPED VIREO FIELD DATA FORM

Study Site	US 281	Weather Conditions		
Tract #			Begin	End
Visit #	4	Temperature	105.8	80.0
Date	4/25/14	Cloud Cover	None	None
Observer	Mini / Sinclair	Precipitation	None	None
Time Begin-End	7:47am - 1:30pm	Wind Speed/Direction	0 mph	10 mph

General Survey Notes (e.g., Additional wildlife information, etc.)

BBWD BCHU CACH RCSP GTOR
BLVI CIFWO BCTI CHSP BHCO
TUVI DOWO CARW SWTA LEGO
RTHA EAPH BEWR NOCA
WWDO WEVI NOMO PABU
MODO NAWA

Species	Song Type	Male #	Female #	Juv #	Distance from Observer (feet)	Direction from Observer (degrees)	Time of Observation	Observation Type (Auditory or Visual)	Observation Mapped or GPS recorded (Yes or No)

Bird Observation Notes – (Age (HY, SY, ASY), behavior observed, etc.)

No GCWA detected

GOLDEN-CHEEKED WARBLER/ BLACK-CAPPED VIREO FIELD DATA FORM

Study Site	US 281	Weather Conditions		
Tract #			Begin	End
Visit #	5	Temperature	74.4	84.2
Date	5/9/14	Cloud Cover	none	none
Observer	Jkuhl/Jleclair	Precipitation	none	none
Time Begin-End	7:00am - 11:30am	Wind Speed/Direction	0 mph	3.8 mph

General Survey Notes (e.g., Additional wildlife information, etc.)

BBWD CHSW BLJA BEWR NOCA BHCO
WVDO BCHU WESJ NOMO PABU LEGO
MODO EAPH CACH RCSP DICK
GRRO STFL BCTT CHSP GTGR
BADO WEVI CARW SUTA

BBWD nested - ~10 ducklings
Fox Squirrel
Southern Leopard frog

Species	Song Type	Male #	Female #	Juv #	Distance from Observer (feet)	Direction from Observer (degrees)	Time of Observation	Observation Type (Auditory or Visual)	Observation Mapped or GPS recorded (Yes or No)

Bird Observation Notes – (Age (HY, SY, ASY), behavior observed, etc.)

No GCWA detected

GOLDEN-CHEEKED WARBLER/ BLACK-CAPPED VIREO FIELD DATA FORM

Study Site	US 281	Weather Conditions		
Tract #			Begin	End
Visit #	4	Temperature	73.9	79.0
Date	5/22/14	Cloud Cover	Cloudy	Cloudy
Observer	Hugh / Michael	Precipitation	none	drizzle
Time Begin-End	10:30am - 12:30pm	Wind Speed/Direction	2.1 mph	1.16 mph

General Survey Notes (e.g., Additional wildlife information, etc.)

BLVI BCHU BCTI SWTA BHCO
TUVI EAPH CARW BUGR HOFI
CRCA WEJJ BEWR DOCA
WPDO CLSW EUST PABU
MODO CACH RCSP LOTA Green anole

Species	Song Type	Male #	Female #	Juv #	Distance from Observer (feet)	Direction from Observer (degrees)	Time of Observation	Observation Type (Auditory or Visual)	Observation Mapped or GPS recorded (Yes or No)

Bird Observation Notes – (Age (HY, SY, ASY), behavior observed, etc.)

No GCWA detected.

ATTACHMENT 4

AVIAN AND OTHER WILDLIFE SPECIES DETECTED

Golden-cheeked Warbler Survey
US 281 in Bexar County, Texas

Other Wildlife Species Detected US 281 2014 GCWA Survey			
Species Identification*			
Family (Subfamily)	**Scientific Name**	**Common Name**	**Code**
AMPHIBIANS			
Hylidae (Hylinae)	*Acris crepitans*	Northern cricket frog	
Ranidae	*Rana sphenocephala*	Southern leopard frog	
REPTILES			
Phrynosomatidae	*Sceloporus olivaceus*	Texas spiny lizard	
Polychrotidae	*Anolis carolinensis*	Green anole	
BIRDS			
Anatidae	*Dendrocygna autumnalis*	Black-bellied Whistling-Duck	BBWD
Cathartidae	*Coragyps altratus*	Black Vulture	BLVU
Cathartidae	*Cathartes aura*	Turkey Vulture	TUVU
Accipitridae (Accipitrinae)	*Buteo jamaicensis*	Red-tailed Hawk	RTHA
Falconidae (Caracarinae)	*Caracara cheriway*	Crested Caracara	CRCA
Columbidae	*Zenaida asiatica*	White-winged Dove	WWDO
Columbidae	*Zenaida macroura*	Mourning Dove	MODO
Cuculidae (Neomorhinae)	*Geococcyx californinianus*	Greater Roadrunner	GRRO
Strigidae	*Strix varia*	Barred Owl	BADO
Apodidae	*Chaetura pelagica*	Chimney Swift	CHSW
Trochilidae (Trochilinae)	*Archilochus alexandri*	Black-chinned Hummingbird	BCHU
Picidae (Picinae)	*Melanerpes aurifrons*	Golden-fronted Woodpecker	GFWO
Picidae (Picinae)	*Picoides scalaris*	Ladder-backed Woodpecker	LBWO
Picidae (Picinae)	*Picoides pubescens*	Downy Woodpecker	DOWO
Tyrannidae (Fluvicolinae)	*Sayornis phoebe*	Eastern Phoebe	EAPH
Tyrannidae (Tyranninae)	*Tyrannus forficatus*	Scissor-tailed Flycatcher	STFL
Vireonidae	*Vireo griseus*	White-eyed Vireo	WEVI
Corvidae	*Cyanocitta cristata*	Blue Jay	BLJA
Corvidae	*Aphelocoma californica*	Western Scrub-Jay	WESJ
Corvidae	*Corvus brachyrhynchos*	American Crow	AMCR
Hirundinidae (Hirundinae)	*Progne subis*	Purple Martin	PUMA
Hirundinidae (Hirundinae)	*Petrochelidon pyrrhonota*	Cliff Swallow	CLSW
Hirundinidae (Hirundinae)	*Hirundo rustica*	Barn Swallow	BARS
Paridae	*Poecile carolinensis*	Carolina Chickadee	CACH
Paridae	*Baeolophus bicolor*	Tufted Titmouse	TUTI
Paridae	*Baeolophus atricristatus*	Black-crested Titmouse	BCTI
Troglodytidae	*Thryothorus ludovicianus*	Carolina Wren	CARW
Troglodytidae	*Thryomanes bewickii*	Bewick's Wren	BEWR
Troglodytidae	*Catherpes mexicanus*	Canyon Wren	CANW

Other Wildlife Species Detected US 281 2014 GCWA Survey			
Species Identification*			
Family (Subfamily)	**Scientific Name**	**Common Name**	**Code**
Regulidae	*Regulus calendula*	Ruby-crowned Kinglet	RCKI
Mimidae	*Mimus polyglottus*	Northern Mockingbird	NOMO
Sturnidae	*Sturnus vulgaris*	European Starling	EUST
Parulidae	*Vermivora ruficapilla*	Nashville Warbler	NAWA
Emberizidae	*Aimophila ruficeps*	Rufous-crowned Sparrow	RCSP
Emberizidae	*Spizella passerina*	Chipping Sparrow	CHSP
Cardinalidae	*Piranga rubra*	Summer Tanager	SUTA
Cardinalidae	*Passerina caerulea*	Blue Brosbeak	BLGR
Cardinalidae	*Cardinalis cardinalis*	Northern Cardinal	NOCA
Cardinalidae	*Passerina caerulea*	Painted Bunting	PABU
Cardinalidae	*Spiza americana*	Dickcissel	DICK
Icteridae	*Euphagus carolinus*	Rusty Blackbird	RUBL
Icteridae	*Quiscalus mexicanus*	Great-tailed Grackle	GTGR
Icteridae	*Molothrus ater*	Brown-headed Cowbird	BHCO
Fringillidae	*Carpodacus mexicanus*	House Finch	HOFI
Fringillidae (Carduelinae)	*Carduelis psaltria*	Lesser Goldfinch	LEGO
MAMMALS			
Leporidae	*Sylvilagus floridanus*	Eastern cottontail	
Sciuridae	*Spermophilus variegatus*	Rock squirrel	
Sciuridae	*Sciurus niger*	Eastern fox squirrel	
Procyonidae	*Procyon lotor*	Raccoon	
Cervidae	*Odocoileus virginianus*	White-tailed deer	